



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/524,803	02/16/2005	Takaaki Kishigami	MAT-8669US	1028
23122	7590	05/30/2008		
RATNERPRESTIA				
P O BOX 980				
VALLEY FORGE, PA 19482-0980				
EXAMINER				
TRAN, THINH D				
ART UNIT		PAPER NUMBER		
2619				
MAIL DATE		DELIVERY MODE		
05/30/2008		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/524,803

Applicant(s)

KISHIGAMI ET AL.

Examiner

THINH D. TRAN

Art Unit

4144

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 April 2008.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-43 is/are pending in the application.
4a) Of the above claim(s) 1-28 is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 29-43 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 16 February 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-850)
Paper No(s)/Mail Date 02/16/2005 and 04/20/2005
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
5) ☐ Notice of Inventor's Patent Application
6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group 4 (claims 29-43) in the reply filed on April 10, 2008 is acknowledged.

Claims 1-28 are withdraw from consideration, claims 29-43 are examined.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 29-43 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 29 recites the limitation "**the space division multiplex transmission**" in claim 29, line 4. There is no antecedent basis.

Claim 29 recites the limitation "**the space-division-multiplex compatible mobile station**" in claim 29 lines 6. There is no antecedent basis. There is a similar problem with claim 31, line 2, claim 32, lines 2, claim 32, lines 9. claim 34, line 4, claim 35 line 4.

Claim 29 recites the limitation "**the mobile station**" in claim 29 lines 10. There is no antecedent basis. There is a similar problem with claim 29, line 14, claim 39, line 5, claim 40, line 5, claim 41, line 5.

Claim 29 recites the limitation "**the space-divisional-multiple-access mobile station**" in claim 29, line 11. There is no antecedent basis. There is a similar problem with claim 30, line 5, claim 36, line 3, claim 37, line 3, claim 38, line 3, claim 42, line 2, claim 43, line 2.

Claim 29 recites the limitation "**a communication area**" in claim 29, line 12. It is unclear because can't tell if it's a new communication area or refers to "a communication area" in claim 29, line 8.

Claim 30 recites the limitation "**an interference**" in claim 30 lines 2. It is unclear because can't tell if it's a new interference or refers to "an interference" in claim 29, line 15, claim 33, line 2.

Claim 31 recites the limitation "**the space-division-multiplex incompatible mobile station**" in claim, 29 lines 6. There is no antecedent basis. There is a similar problem with claim 31, line 11, claim 32, line 3, claim 32, line 6, claim 32, line 8, claim 32, line 11, claim 33, line 5.

Claim 31 recites the limitation "**space division multiple access**" in claim 31, line 4. It is unclear because can't tell if it's a new space division multiple access or refers to "space division multiple access" in claim 29, line 12, claim 32, line 4.

Claim 31 recites the limitation "**a transmission beam**" in claim 31 lines 7. It is unclear because can't tell if it's a new transmission beam or refers to "transmission beam" in claim 29, line 9. There is a similar problem with claim 31, line 10, claim 32, line 7, claim 32, line 10, claim 42, line 5, claim 42, line 9, claim 43, line 5, claim 43, line 9.

Claim 34 recites the limitation **"a transmission data sequence"** in claim 34, line 3. It is unclear because can't tell if it's a new data transfer sequence or refers to "transmission data sequence" in claim 29, lines 10. There is a similar problem with claim 35, line 3.

Claim 36 recites the limitation **"the space-division-multiplex mobile station"** in claim 36, line 4. There is no antecedent basis. There is a similar problem with claim 37, line 4, claim 38, line 4.

Claim 39 recites the limitation **"the communication area"** in claim 39, line 6. It is unclear because can't tell if it refers to "communication area" in claim 29, line 8 or line 12. There is similar problem with claim 40, line 6, claim 41, line 6.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 29, 30, and 33-35 are rejected under 35 U.S.C. 102(e) as being anticipated by Onggosnusi et al. (US 7,110,378).

Regarding claim 29, as it is understood in view of the above 112 problem, Onggosnusi teaches a base station apparatus comprising: a partial-space

orthogonalizing means for making a weighting process (see col. 5 lines 24-30, wherein the beamformer weight (see fig. 1 block 30) determiner a set of beamformer weight then pass to transmitter module, wherein the transmitter module would comprise "partial-space orthogonalizing", (fig. 2 block 38, block)), for enhancing orthogonality over a propagation path for the space division multiplex transmission (see col. 5 lines 40-44, wherein the weight is applied to a unique sub-channel, which would read in the claim as "a propagation path," col. 10 line 4-7, wherein the weights are deprive from an orthogonal eigenvenvector and applied to the signal to transmit or receive signal via the orthogonal sub channel, which would read in the claim as enhancing orthogonality, wherein with beamforming technology, it enables to reuse frequency and time slot for transmission), on a transmission data sequence to be sent by space division multiplex to the space-division-multiplex compatible mobile station allocated for space division multiplex transmission within a communication area (see col. 6 lines 15-29, wherein a stream of data is transmitted to a receiver, the transmitter module would consider as the "space division multiplex", while the receiver would read in the claim as the "compatible mobile station", and the weight are used to direct the beam toward a communication area, see col. 5 lines 24-30); a beam forming section for forming a transmission beam to the mobile station (see col. 5 lines 24-30, wherein the beamformer weight (see fig. 1 block 30) determiner a set of beamformer weight then pass to transmitter module, see col.6 lines 2-5, wherein the signal is being weighted by the beamformer weight vector, to form a directional transmission) responsive to a

transmission data sequence to the space-division-multiple-access mobile station allocated for space division multiple access within a communication area (see col. 5 19-30, wherein the sub-channels selected base upon the channel state and the channel state can be obtained through transmission of training symbol sequences (transmission data sequence), and the weight can be obtained from the channel state information (CSI), that are feed back to the transmitter (see col. 15 lines 54-57, col. 16 lines 14-19), wherein receiver (mobile station) can belong to the number of multi-access can be accommodated without interference (see col. 21 lines 16-17), wherein the beamformer direct the transmission that generate a communication area) and an output of the partial-space orthogonizing means (see col. 5 lines 65-67 and col. 6 lines 1-5, wherein in response to the signal modulator 18 and connected to the weight coupling, which would consider as the "partial-space orthogonizing") the transmission beam to the mobile station being to reduce an interference with another mobile station to access simultaneously (see col. 21 lines 16-20, col. 21 32-43, wherein it shows the N-user access without multi-access interference); and a plurality of antennas for transmitting the transmission beam (see col. 4 lines 61-63, fig. 1 block 14).

Regarding claim 30, Onggosnusi teaches wherein forming the transmission beam for reducing an interference by the beam forming section is to form the transmission beam from the transmission data sequence to the allocated space-division-multiple-access mobile station (see col. 9 lines 16-19, wherein the matrix H is represented as the overall channel characteristic for the available signal paths

of the transmitted signal, in col. 21 lines 59-60 shows that the beamformer optimize the k-th user BER, wherein the BER depend on the interference, which the lower error rate the lower the interference) and the output of the partial-space orthogonizing means, in a manner being orthogonal to a channel estimation matrix on another mobile station to access simultaneously (see col. 9 lines 16-19, wherein the matrix H is represented as the overall channel characteristic for the available signal paths. see col. 10 lines 1-7, wherein the output after beamformer vector derives from the eigenvectors would be orthogonal to the matrix H).

Regarding claim 33, Onggosnusi teaches forming the transmission beam for reducing an interference by the beam forming section is to form the transmission beam orthogonal to a channel estimation matrix on another of the space-division-multiplex incompatible mobile station and space-division-multiplex compatible mobile station to access simultaneously (see col. 9 lines 16-19, wherein the matrix H is represented as the overall channel characteristic for the available signal paths of the transmitted signal, in col. 21 lines 59-60 shows that the beamformer optimize the k-th user BER, wherein the BER depend on the interference, which the lower error rate the lower the interference).

Regarding claim 34, Onggosnusi teaches space-time coding means for making a space-time coding process on a transmission data sequence to the space-division-multiplex compatible mobile station (see col. 6 lines 1-8, wherein the modulated signal stream are transmitted over multiple antennas (space time coded) and weighted with corresponding value (partial-space orthogonizing)), the transmission

data sequence space-time-coded being outputted to the partial-space orthogonizing means **(see col. 5 lines 30-35, wherein the stream of data transmits to the single stream transmitter module 18, wherein the transmitter module would comprise partial-space orthogonizing).**

Regarding claim 35, Onggosnusi teaches space-time coding means for making a space-time coding process on a transmission data sequence to the space-division-multiplex compatible mobile station **(see col. 6 lines 1-8, wherein the modulated signal stream are transmitted over multiple antennas (space time coded) and weighted with corresponding value (partial-space orthogonizing))**, the transmission data sequence space-time-coded being outputted to the partial-space orthogonizing means **(see col. 5 lines 30-35, wherein the stream of data transmits to the single stream transmitter module 18, wherein the transmitter module would comprise partial-space orthogonizing).**

Allowable Subject Matter

6. Claims 31, 32, and 36-43 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Regarding claim 31, prior arts in the record fail to teach wherein, in a case that the space-division-multiplex compatible mobile station and the space-division-multiplex incompatible mobile station are allocated for space division multiple access at a same time, the beam forming section makes, for the space-division-multiplex incompatible

mobile station, a maximum ratio synthetic beam as a transmission beam to the space-division-multiplex incompatible mobile station and, for the space-division-multiplex compatible mobile station, a transmission beam as a beam for reducing an interference with another of the space-division-multiplex incompatible mobile station and space-division-multiplex compatible mobile station to access simultaneously.

Regarding claim 32, prior arts in the record fail to teach wherein, in a case that the space-division-multiplex compatible mobile station and the space-division-multiplex incompatible mobile station are allocated for space division multiple access at a same time, the beam forming section makes, for the space-division-multiplex incompatible mobile station, a maximum ratio synthetic beam as a transmission beam to the space-division-multiplex incompatible mobile station and, for the space-division-multiplex compatible mobile station, a transmission beam as a beam for reducing an interference with another of the space-division-multiplex incompatible mobile station and space-division-multiplex compatible mobile station to access simultaneously.

Regarding claims 36, 37, and 38, prior arts in the record fail to teach a deciding section for allocating the space-division-multiple-access mobile station and the space-division-multiplex mobile station by use of a predetermined space-division-multiplex transmission evaluation criterion and space-division-multiple-access evaluation criterion.

Regarding claims 39, 40, and 41, prior arts in the record fail to teach the space division multiplex transmission evaluation criterion and the space-division-multiple-access evaluation criterion are to be calculated depending upon a channel estimation value and received quality received from the mobile station of within the communication area.

Regarding claims 42 and 43, prior arts in the record fail to teach in a case that the space-division-multiple-access mobile stations include a space-division-multiplex compatible mobile station and a space-division-multiplex incompatible mobile station, a transmission beam to the space-division-multiplex incompatible mobile station is formed by use of a complex-conjugate-transposition of a channel estimation matrix on the space-division-multiplex incompatible mobile station, and a transmission beam to the space-division-multiplex compatible mobile station is formed in a manner being orthogonal to a channel estimation matrix on another space-division-multiple-access mobile stations to access simultaneously.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Walton et al. (US 2003/0128658) disclose the system of resource allocation for MIMO-OFDM communication systems.

Raleigh et al. (US 6,144,711) disclose the system of Spatio-Temporal processing for communication.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to THINH D. TRAN whose telephone number is (571)270-3934. The examiner can normally be reached on Monday to Friday from 7:30 AM to 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven H. Nguyen can be reached on (571)272-3159. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

T.T.
05/12/2008

/Steven H.D Nguyen/
Primary Examiner, Art Unit 2619